SUBSTITUTE SPECIFICATION

for

U.S. Patent Application No. 10/570,347

(CLEAN VERSION)

TITLE OF THE INVENTION

CROSS-COUNTRY SKI SYSTEM PROVIDED WITH A DIRECT BEARING LATERAL SURFACE

INVENTORS

François GIRARD

François DUFOURNET

Alois PIEBER

Johann HUBINGER

Hannes KOGLER

Attorney Docket No. **P29468**

(S 1047/US/PCT)

CROSS-COUNTRY SKI SYSTEM PROVIDED WITH A DIRECT SUPPORT LATERAL SURFACE

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates to the field of cross-country skiing.

2. Description of Background and Relevant Information

[0002] For a long time, cross-country skis have been used with rudimentary devices for binding the boot to the ski. The boot sole had, for example, a tongue or a binding strap extending beyond the front end of the boot and which was held in a lock arranged forward from the position of the boot in relation to the ski.

[0003] It has been realized that this type of binding had two major drawbacks. During the practice of the conventional alternate step technique, it was noticed that these systems necessitated a forward rotational movement of the boot in relation to the ski which was located far ahead of the foot. The result was a movement of the foot that was not natural, far from the foot rolling movement that can be observed when walking. During the practice of the skating step, these systems also had the drawback of providing only a very poor lateral guidance of the boot in relation to the ski.

[0004] In order to remedy these problems, systems for binding the boot to the ski, whereby the boot was articulated on the ski about an axis arranged immediately behind the front end of the sole, were introduced in the 1980s. These systems had at least part of the binding device arranged under the boot sole. This enabled the boot pivot point to be moved back in relation to the ski and to rigidify the torsional strength of the boot/binding assembly during the practice of the skating step.

[0005] The device described in the document FR-2.739.788 shows that the articulation axis of the boot as well as the elastic return means, which tend to apply the boot flat against the ski, are located under the sole.

[0006] Other devices, which are described, for example, in the documents FR-2.742.060, FR-2.782.652, WO-01/93963, WO-02/05907, or WO-02/087710, confirm that the trend is to seek a positioning of the binding device that is as much under the boot sole as possible, and no longer mainly at the front of the boot.

[0007] However, many of these systems have the drawback of being positioned between the boot and the ski, and of particularly raising the boot in relation to the ski. The primary consequence of this is not allowing for a direct support of the boot on the ski, which can negatively affect a proper support on the ski edges, especially for the practice of the skating step. In addition, in the known systems, the support of the boot on the ski does not occur directly on the ski, but rather generally by means of a baseplate which covers more or less the entire width of the ski upper surface, such as shown, for example, in the document EP-878.218. The presence of such a baseplate increases the height of the boot position and has a tendency to also distribute the pressure over the width of the ski whereas, during edge setting, one wishes instead to concentrate a maximum of the ski pressure on one of the edges, typically the inner edge.

SUMMARY OF THE INVENTION

[0008] An object of the invention is therefore to provide a cross-country ski which provides for better transmission of forces on the ski edges, as well as optimal stability.

[0009] To this end, the invention provides a cross-country ski having a binding zone adapted to receive a device for binding a boot to a ski, wherein the binding zone includes a location for receiving the binding device, and an upper support surface of the ski that is arranged on at least one side of the location for receiving the binding device and on which the boot can possibly come in direct contact when the user applies a pressure force.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other characteristics and advantages of the invention will appear from the detailed description that follows, with referenced to the annexed drawings, in which:

FIG. 1 is a partial, exploded perspective view of a cross-country ski system according to a first embodiment of the invention;

FIG. 2 is a cross-sectional schematic view of the cross-country ski system according to FIG. 1;

FIG. 3 is a perspective view of the cross-country ski alone, including lateral shoulders to carry out a second embodiment of the invention;

FIG. 4 is a transverse, cross-sectional schematic view of a cross-country system incorporating a ski having a shoulder;

FIG. 5 is a side schematic view of an alternative embodiment of the invention;

FIG. 6 is a transverse, cross-sectional schematic view along the line VI-VI of FIG. 5; and

FIG. 7 is a schematic view of the upper surface of a ski as shown in FIGS. 5 and 6.

DETAILED DESCRIPTION OF THE INVENTION

[0011] FIG. 1 shows a system for cross-country ski system including a ski 10, only a central zone of which is shown. A device 12 for binding a cross-country ski boot 14 is mounted on this central zone of the ski. More specifically, the binding device 12 occupies, in this central zone, a location that corresponds to at least the size of the device viewed from above.

[0012] The binding device 12 is, for example, similar to that described in the document FR-2.739.788 and family member US-6,017,050, which will be referred to for a detailed description. This device includes a front jaw 16 in which a front bar 18 of the boot 14 is adapted to be locked to enable the attachment of the boot to the ski by means of articulation about the transverse axis of the bar. For this purpose, this

binding device 12 enables the boot heel to be lifted from the ski. The device 12 also includes longitudinally, at the rear of the jaw 16, an elastic return mechanism that includes an articulated connecting rod 20 adapted, for example, to hook a rear bar (not shown) arranged under the sole 22 of the boot 14. Finally, in the rear extension of the connecting rod, the binding device 12 also includes a guiding edge 24, or rib, the profile of which is complementary to a corresponding groove (not shown) formed under the boot sole.

[0013] According to the invention, the arrangement of the binding device 12 on the ski 10 is such that it is arranged transversely on both sides of the position of the binding device 12, of the portions of the upper surface 26 of the ski that form support surfaces 28 which corresponding support surfaces 30 of the boot sole are adapted to contact directly.

[0014] The invention encompasses several alternative embodiments.

[0015] FIGS. 1 and 2 show the case where the ski has an upper surface 26 that is essentially flat. In this case, the binding device 12 is arranged in a position that is transversely at the center of the ski. In this case, the location of the binding device 12, that is, the portion of the ski upper surface, on which the binding device 12 is to be arranged, is located at the same height as the direct support lateral surfaces 28.

[0016] FIGS. 3 and 4 show an alternative embodiment in which the ski has, at least in its portion longitudinally located at the center, two lateral shoulders, which longitudinally extend on each side of the binding location 29, which is transversely located at the center of the ski. In this case, the upper surfaces of these shoulders advantageously form the direct support surfaces 28 in the context of the invention.

[0017] With respect to a ski having a planar, or flat, upper surface, the shoulders can be made in the form of elevated bosses, or they can result from a recess in the central portion of the ski, this recess thus defining the location of the ski binding device.

[0018] This embodiment allows achieving a lower position for the binding, and therefore a lower position of the boot with respect to the snow, which can favorably affect the stability of the system.

[0019] Contrary to the embodiment shown in FIG. 3, it can be provided that the lateral edges of the ski upper surface, on which the lateral support surfaces are formed, are arranged at a lower level than that of the binding device location. This results in a ski, the thickness of which is reduced on the lateral edges, thus reducing the height of the support surfaces in relation to the ski edges, while maintaining these support surfaces on both sides of the binding device.

[0020] In the example shown in FIG. 3, the difference in the level between the binding location and the two upper surfaces of the shoulders progressively varies so as to progressively disappear toward the front and rear ends of the shoulders (which therefore do not extend over the entire ski length). Conversely, for example in the case where binding location results in a recess of the ski upper surface, the function of the front and rear ends of the recess with the ski upper surface can form a step.

[0021] In both cases, one can see in FIG. 2 and 4 that the support surfaces of the boot sole take support directly on the lateral surfaces 28, without having an intermediate element such as a plastic element between the two lateral surfaces. The transmission of the user's support forces, especially in the thrust phase, is thus made directly and is improved.

[0022] The binding device 12 shown in the drawings is a simple embodiment, and the invention can be implemented with other types of binding devices adapted for the practice of cross-country skiing. The invention also encompasses the binding device being partly integrated into the ski, for example with an element that is articulated directly in the ski, or with part of the guiding edge integrated into the ski. However, the invention provides that, at least in the area of the support zone, the binding device is narrower than the ski. These support zones are preferably longitudinally arranged in an area corresponding to the metatarsophalangeal bending zone of the user's foot, which is the preferred zone through which the user exerts his support force at the end of the thrust, when his heel is already raised with respect to the ski.

[0023] Similarly, the examples show the case where two support surfaces are provided on respective sides of the binding. However, taking into account that the forces are mostly important on the side of the ski inner edge, during the practice of the skating step, one can provide that the ski include only one direct support lateral surface, arranged on only one side of the binding device.

[0024] Preferably, the lateral support surfaces 28 of the ski are substantially horizontal, meaning that they are substantially parallel to the lower gliding surface of the ski.

[0025] However, in the example of embodiment shown in FIGS. 5 to 7, it can be provided that the lateral support surfaces 28, instead of being flat or planar, a curvature complementary to a curvature of the lower surface 30 of the boot sole.

[0026] Similarly, as can be seen in FIGS. 6 and 7, the lateral support surfaces 28 can be configured so that at least in the area of the support zone, the transverse width of the ski upper surface is greater than the width of the lower gliding surface of the ski through which the ski takes support on the snow. Such a construction, which results in the presence of oblique edges 32 on the ski, i.e., angled from perpendicular to the lower surface 101, shown greater than ninety degrees, makes it possible to increase edging. As can be seen, the importance of the lateral offset of the support surfaces 28 can be different on each side of the ski, which can thus have a dissymmetrical section. In addition, such a concept makes it also possible to rigidify the ski in torsion.

ABSTRACT OF THE DISCLOSURE

A cross-country ski includes a cross-country ski having a central area for receiving a ski binding device for fixing a ski boot to the ski. The fixing area includes a space for receiving the binding device and a top bearing surface of the ski which is applied to at least one side of the space for receiving the binding device and on which the boot is directly connectable when the user applies a pressure force.